

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

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ROL BREMEN

Applicant's or agent's file reference  
663654

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## NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing (day/month/year)	06.08.2004
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## IMPORTANT NOTIFICATION

International application No. PCT/JP 03/03140	International filing date (day/month/year) 17.03.2003	Priority date (day/month/year) 18.03.2002
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Applicant  
MATSHUSITA ELECTRIC INDUSTRIAL CO. LTD. et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

#### 4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

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## PATENT COOPERATION TREATY

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## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference 663654	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/JP 03/03140	International filing date (day/month/year) 17.03.2003	Priority date (day/month/year) 18.03.2002
International Patent Classification (IPC) or both national classification and IPC C07K14/47		
Applicant MATSUSHITA ELECTRIC INDUSTRIAL CO. LTD. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
 

This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 14 sheets.
3. This report contains indications relating to the following items:
  - I  Basis of the opinion
  - II  Priority
  - III  Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV  Lack of unity of invention
  - V  Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI  Certain documents cited
  - VII  Certain defects in the international application
  - VIII  Certain observations on the international application

Date of submission of the demand 15.10.2003	Date of completion of this report 06.08.2004
Name and mailing address of the International Preliminary Examining Authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Gabriel, C Telephone No. +49 89 2399-7112



INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT

International application No.

PCT/JP 03/03140

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-4, 6-38 as originally filed  
5, 5a received on 19.06.2004 with letter of 18.06.2004

**Claims, Numbers**

1-21 filed with telefax on 30.06.2004

**Drawings, Sheets**

1/7-7/7 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/JP 03/03140

5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes: Claims	1-21
	No: Claims	
Inventive step (IS)	Yes: Claims	1-21
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-21
	No: Claims	

**2. Citations and explanations**

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. The following documents (D1-D2) are referred to in this communication:

D1: BECK A, HOFMANN M: 'IRML: A Rule Specification Language for Intermediate Services; Version 02' IETF INTERNET DRAFT, [Online] 21 November 2001 (2001-11-21), pages 1-27, XP002256751 Retrieved from the Internet: <URL:www.globecom.net/ietf> [retrieved on 2003-09-30]

D2: SRISURESH P ET AL: 'Middlebox communicatin architecture and framework;' INTERNET ENGINEERING TASK FORCE, XX, XX, 28 February 2002 (2002-02-28), pages 1-35, XP002211545

2. With the new set of claims filed by fax on 30.06.2004, received on 02.07.2004, the applicant amended the subject-matter of claims 1-21 on file. The amendments satisfy the requirements of Articles 19 (2) and 34(2) (b) PCT. Basis can be found in the set of claims as originally filed.

As a result of these amendments, the objections made during the search procedure in respect of lack of unity (Rule 13 PCT) have been overcome.

3. The subject-matter of independent claims 1, 17 and 21 is new and involves an inventive step for the following reasons:

- 3.1 Document D1, which represents the most relevant prior art, discloses according to part of the features of claim 1,

a network control framework apparatus for controlling resources at an intermediate network element connecting two or more communications networks (abstract) comprising:

- a gateway module providing gateway functionality ("intermediary device" on page 4, par. 3),
- a rule engine module to perform network resource control decisions based on specified rules ("rule processor" on page 4, par. 3), wherein the rules are specified in a rule specification format ("XML" on page 4, par. 5) hereafter referred to as a Rule Specification,
- at least one special package added on to the rule engine module ("IRML-

specified rules" on page 4, par. 3) offering specialized functionality to the rule engine module,

- d) a rule injection module ("rule processor" in section 4. and 4.1) to inject or remove Rule Specification to or from the rule engine module (section 4.1), and
- e) a means for distribution of said Rule Specification to at least one intermediate network element ("mechanism for transferring IRML rule files to intermediary devices" on page 4, par. 6) comprising:
  - i) means for distribution of indications in the Rule Specification to indicate that part or whole of the Rule Specification is to be distributed ("property" element on page 11, paragraph 5 and 6).
  - iv) means for identifying the target network element to distribute part or whole of a Rule Specification [to] ("rule" element in section 3.5.1),
  - vi) means for retrieval of the part or whole of Rule Specification distributed to the target network element from the intermediate network element that distributes the part or whole of Rule Specification ("transferring IRML rule files to intermediary devices" on page 4, par. 6) .

2.2 The subject-matter of claim 1 differs from the disclosure of Document D1 in that:

the means for distribution of said Rule Specification comprises:

- ii) means for distribution of a signature embedded into data packets to announce the capabilities of the intermediate network elements the data packet traversed,
- iii) means for parsing the Rule Specification to determine if part or whole of the Rule Specification is distributed,
- v) means for distribution of a signaling embedded into data packets to inform target network element of the distribution of part or whole of Rule Specification,

2.3 The problem to be solved by the present invention is therefore regarded as determining automatically which of a number of intermediate network elements is capable of performing a Rule Specification, and which of the intermediate network elements the Rule Specification should be distributed to.

2.4 When confronted with this problem, the skilled person would not solve the problem based on his common general knowledge or by using the prior art cited in the search report by adding the additional features of claim 1, especially since

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neither of the cited documents addresses the problem identified above or discloses or suggests to use a signature announcing the capabilities of an intermediate network element.

Hence, the skilled person would not be prompted to include the additional features of claim 1 in the apparatus of document D1. As a consequence, claim 1 appears to meet the requirements of Articles 33(1)-(3) PCT in respect of novelty and inventive step.

- 2.5 Independent method claim 17 and independent network claim 21 correspond to claim 1, whereby all the features of claim 1 are represented by a corresponding feature in claim 17 and 21. Hence, these claims also appear to meet the requirements of Articles 33(1)-(3) PCT in respect of novelty and inventive step.
- 2.6 Since dependent claims 2-16 contain all the features of claim 1, and claims 18-20 contain all the features of independent claim 17, these claims also appear to meet the requirements of Articles 33(1)-(3) PCT in respect of novelty and inventive step.

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Beck A. Höfmann, M.: "IRML: A Rule Specification Language for Intermediate Services; Version 02" IETF INTERNET DRAFT, [Online] 21 November 2001 (2001-11-21), pages 1-17 discloses web services as a new class of applications running on networked computers in a distributed environment. These services are invoked either directly by application end points or through intermediaries acting on behalf of application end points. Such intermediaries can appear in the form of caches, proxies, gateways, switches etc. and are also referred to as service dispatchers, application brokers, service brokers etc. IRML (Intermediary Rule Mark-up Language) is designed to serve as a simple and efficient, but yet powerful language to express the service execution policies of application end points. IRML rules are typically processed by intermediaries that trigger the execution of web services according to these rules and policies.

Srisuresh P et al: « Middlebox communication architecture and framework; "INTERNET ENGINEERING TASK FORCE, 28 February 2002 (2202-02-28), pages 1-35 discloses that there are a variety of intermediate devices in the internet today that require application intelligence for their operation. Diagrams pertaining to real-time streaming applications such as SIP and H. 323 and peer-to-peer application such as Napster and NetMeeting can not be identified by merely examining packet headers.

#### Disclosure of Invention

25. To solve the problem listed in section 3.3, the present invention allows content providers, access providers, and/or

The current use of intermediaries in content delivery is mostly restricted to providing simple functionality such as HTTP caching, HTTP proxy, or RTSP proxy. This cannot hope to maintain the service level demanded by the users of today's Internet, as the number of end-users increases exponentially. Moreover, with the range of hardware devices and software agents employed to retrieve contents by different users are also broadening, content providers are finding it difficult to present to the users a coherent set of contents are that suited to the user's device and preferences.

Though various international bodies have recognized the above problems, and have acted to provide resolutions, their work could still be improved on. The OPES framework described in focused on the operations of a single intermediary, ignoring the current trend of collaborations between content delivery networks. In addition, though the idea of the OPES framework is to perform content adaptation so as to enhance the user experience in content retrieval, it focused only on parameters of the HTTP. This is not only inadequate for device independence, it also does not cater to the growing number of audiovisual streaming applications.

~~Eisenführ, Speiser & Partner~~~~Bremen, 30 June 2004~~~~Our Ref.: MA 7452-01WO, STK/emu  
Direct Dial: 0421/36 35 694~~~~Applicant: MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.  
Serial Number: PCT/JP03/03140~~NEW CLAIMS

1. A network control framework apparatus for controlling resources at an intermediate network element connecting two or more communications networks comprising:
  - a) a gateway module (101) providing gateway functionality,
  - b) a rule engine module (102) to perform network resource control decision based on specified rules, wherein the rules are specified in a rule specification format hereafter referred to as a Rule Specification,
  - c) at least one special package (103) added on to the rule engine module offering specialized functionality to the rule engine module,
  - d) a rule injection module (104) to inject or remove Rule Specification to or from the rule engine module, and
  - e) a means for distribution of said Rule Specification to at least one intermediate network element comprising

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- i. means for distribution of indications in the Rule Specification to indicate that part or whole of the Rule Specification is to be distributed,
- ii. means for distribution of a signature embedded into data packets to announce the capabilities of the intermediate network elements the data packet traversed,
- iii. means for parsing the Rule Specification to determine if part or whole of the specified Rule Specification is distributed,
- iv. means for identifying the target network element to distribute part or whole of a Rule Specification,
- v. means for distribution of a signalling embedded into data packets to inform target network element of the distribution of part or whole of Rule Specification,
- vi. means for retrieval of the part or whole of Rule Specification distributed to the target network element from the intermediate network element that distributes the part or whole of Rule Specification.

2. The apparatus as recited in claim 1, wherein the format of said indications of part or whole of Rule Specification for distribution comprises

- i. the specification of the direction of distribution by specifying the endpoint of the specified direction,
- ii. the specification of the number of intermediate network elements towards the specified endpoint,
- iii. the specification of the number of intermediate network elements from the specified endpoint, and/or
- iv. the specific content distributed at the intermediate network elements.

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3. The apparatus as recited in claim 1, wherein the format of said signature embedded into data packets comprises

- i. the identification of the intermediate network element the signature belongs to,
- ii. the special packages that are installed on the intermediate network element the signature belongs to, and
- iii. the capability of accepting or generating part or whole of a Rule Specifications for distribution.

4. The apparatus as recited in claim 1 or 3 wherein the signatures of the intermediate network elements that the data packets traversed are stored with the starting and ending points between which the data packets traversed in the order of which the data packets traversed and the transmission protocol the data packets belongs to.

5. The apparatus as recited in claim 1, 3 or 4, wherein the format of said signature comprises the identification of the intermediate network element and the installed at least one special package at the intermediate network element.

6. The apparatus as recited in claims 1, 3, 4 or 5, wherein the format of said signatures comprises

- i. the identification of the ending point that the data packets flow to,
- ii. the identification of the starting point that the data packets flow from,
- iii. the transmission protocol the data packets belongs to,

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- iv. the array of signatures of the intermediate network elements in the order of the data packets traverse from the intermediate network element where the data format is stored to the ending point, and
- v. the number of signatures of the intermediate network elements in the order of the data packets traverse from the intermediate network element where the data format is stored to the ending point.

7. The apparatus as recited in any of the preceding claims, further comprising means for signalling to signal the intermediate network element to express the desire to distribute collection of rules in a Rule Specification to the intermediate network element comprising

- i. the identification of the intermediate network element where the collection of rules in a Rule Specification is distributed to,
- ii. the identification of the intermediate network element where the collection of the at least one rules in a Rule Specification is distributed from, and
- iii. the identification of the collection of the at least one rule in a Rule Specification.

8. The apparatus as recited in any of the preceding claims, further comprising a means of retrieving the collection of rules in a Rule Specification from the intermediate network element that distributes the collection of rules by the intermediate network element where the collection of rules is distributed to, comprising

- i. means for establishing a communication channel between the intermediate network element where the collection of rules is distributed to and the intermediate network element where the collection of rules is distributed from,

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- ii. means for providing the identification of the collection of rules that is distributed via the communications channel by the intermediate network element where the collection of rules is distributed to, and
- iii. means for transmitting the collection of rules that is distributed via the communications channel by the intermediate network element where the collection of rules is distributed from.

9. The apparatus as recited in any of the preceding claims, wherein said communications networks comprise an endpoint node, hereafter referred to as a client node, for sending a request to the other endpoint node, hereafter referred to as a server node, via at least one intermediate network element, wherein the server node is adapted for accepting the request with an appropriate response, wherein said communications networks further comprise means for setting up a communications channel between the server node and the client node through the intermediate network elements, and wherein the server node is adapted for starting transmitting data packets through the communications channel to the client node until the client node sends a request, via the intermediate network elements, to tear down the communications channel, and wherein the client node is adapted for transmitting information about the transmission statistics back to the server node.

10. The apparatus as recited in claim 9, further comprising a means of providing the author of Rule Specification to trigger a singular or plurality of rules at a intermediate network element based on the following control methods

- i. the rule to be evaluated when the intermediate network element received a request packet from the client node to the server node,
- ii. the rule to be evaluated when the intermediate network element received a response packet from the server node to the client node,

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- iii. the rule to be evaluated when the intermediate network element received a data packet containing contents sent by the server node to the client node through the communications channel established between the server node and the client node,
- iv. the rule to be evaluated when the intermediate network element received a data packet containing the transmission statistics from the client node to the server node,
- v. the rule to be evaluated when the intermediate network element received a specified number of data packet containing contents sent by the server node to the client node through the communications channel established between the server node and the client node, and
- vi. the rule to be evaluated when the intermediate network element received a data packet containing contents sent by the server node to the client node through the communications channel established between the server node and the client node after the elapse of a recurrent timer of a specified timer value.

11. The apparatus as recited in any of the preceding claims comprising a control means for using a set of parameters in the Rule Specification to control at least one content or content delivery sessions to achieve device independence in the delivery of said content, comprising

- i. the set of User Preference parameters consisting of the preferences of the human user consuming the content,
- ii. the set of Agent Capabilities parameters consisting of the capabilities of the software agent employed by the human user to retrieve the content,
- iii. the set of Device Capabilities parameters consisting of the capabilities of the hardware employed by the human user to retrieve the content, and

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- iv. the set Natural Environment parameters consisting of the information about the environment in which the human user retrieves the content.

12. The apparatus as recited in claim 13, wherein the set of User Preference parameters comprises

- i. the human user's preferences on the method of retrieving the content,
- ii. the human user's preferences on the language used in the retrieved contents,
- iii. the human user's preferences on the presentation of the retrieved content,
- iv. the age group of the human user retrieving the content,
- v. the gender of the human user retrieving the content, and
- vi. the employment status of the human user retrieving the content.

13. The apparatus as recited in claim 11, wherein the set of Agent Capabilities parameters comprises

- i. the type of software agent employed by the human user to retrieve the content,
- ii. the content formats supported by the software agent employed by the human user to retrieve the content,
- iii. the content languages supported by the software agent employed by the human user to retrieve the content, and
- iv. the transmission protocols supported by the software agent employed by the human user to retrieve the content.

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14. The apparatus as recited in claim 11, wherein the set of Device capabilities parameters comprises

- i. the type of hardware employed by the human user to retrieve the content,
- ii. the processor speed and processor family of the hardware employed by the human user to retrieve the content,
- iii. the memory capacity of the physical and secondary storage of the hardware employed by the human user to retrieve the content,
- iv. the display depth and resolution of the hardware employed by the human user to retrieve the content, and
- v. the operating system running on the hardware employed by the human user to retrieve the content.

15. The apparatus as recited in claim 11, wherein the set of Natural Environment parameters comprising

- i. the information of the location where the human user is retrieving the content,
- ii. the information of the mobility of the human user retrieving the content, and
- iii. the information of the illuminations conditions in which the human user is retrieving the content.

16. The apparatus as recited in any of claims 11 to 14, wherein the at least one special package is capable of interpreting and evaluating said Rule Specification.

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17. A network control framework method for controlling resources at an intermediate network element connecting two or more communications networks comprising the steps of:

- a) providing gateway functionality by a gateway module,
- b) performing network resource control decision by a rule engine module based on specified rules, wherein the rules are specified in a rule specification format hereafter referred to as a Rule Specification,
- c) offering specialized functionality to the rule engine module by at least one special package added on to the rule engine module,
- d) injecting or removing Rule Specification to or from the rule engine module by a rule injection module, and
- e) distribution of said Rule Specification to at least one intermediate network element comprising the steps of
  - i. distribution of indications in the Rule Specification to indicate that part or whole of the Rule Specification is to be distributed,
  - ii. distribution of a signature embedded into data packets to announce the capabilities of the intermediate network elements the data packet traversed,
  - iii. parsing the Rule Specification to determine if part or whole of the specified Rule Specification is distributed,
  - iv. identifying the target network element to distribute part or whole of a Rule Specification,
  - v. distribution of a signalling embedded into data packets to inform target network element of the distribution of part or whole of Rule Specification,
  - vi. retrieval of the part or whole of Rule Specification distributed to the target network element from the intermediate network element that distributes the part or whole of Rule Specification.

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18. The method as recited in claim 17, further comprising a step of extracting the signature of intermediate network elements embedded in at least one data packet, comprising the steps of

- i. checking if there are embedded signatures in the data packets,
- ii. checking if there exist a signature in a predetermined data format that is previously stored having the same starting and ending points and transmission protocol,
- iii. allocating a new data format when there is no data format that is previously stored having the same starting and ending points and transmission protocol,
- iv. purging data stored in the data format that previously existed having the same starting point, ending point and transmission protocol,
- v. preparing an empty last-in-first-out data structure,
- vi. extracting each embedded signature in the data packet and pushing it to the last-in-first-out data structure,
- vii. removing each element in the last-in-first-out data structure and recording it to the predetermined data format, and
- viii. recording the number of embedded signature extracted in the predetermined data format.

19. The method as recited in one of claims 17 or 18, further comprising a step of parsing a Rule Specification to determine if part or whole of the Rule Specification is to be distributed comprising the steps of

- i. checking each rule in the Rule Specification for syntactical validity,
- ii. rejecting the rule if there is syntactical errors,
- iii. checking the rule for a distribution indication,

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- iv. evaluating the rule locally if there exist no distribution indication,
- v. determining the remote intermediate network element to distribute the rule to,
- vi. evaluating the rule locally if no suitable remote intermediate network element to distribute the rule to can be found,
- vii. checking if the remote intermediate network element contains the special package or special packages required in the rule,
- viii. evaluating the rule locally if the remote intermediate network element do not have the required special package or special packages, and
- ix. distributing the rule to the remote intermediate network element.

20. The method as recited in claim 17, further comprising a method of determining the remote intermediate network element that a rule is to be distributed to given a predetermined distribution indication, comprising the steps of

- i. locating a signature in a predetermined data format with the matching starting point, ending point and transmission protocol,
- ii. declaring no suitable remote intermediate network element if no predetermined data format can be located,
- iii. setting a temporary variable to the specified number of the intermediaries towards or from the specified endpoint in the given distribution indication,
- iv. setting the temporary variable to the value of the number of intermediaries as given in the located predetermined data format if the specified number of the intermediate network elements towards or from the specified endpoint in the given distribution indication is greater than the number of intermediate network elements towards or from the specified ending point in the given distribution indication,

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- v. whereas the specified distribution indication consists of the specification of the ending point and the specification of the number of intermediate network elements towards the specified ending point, set the temporary variable to a value equals the number of intermediate network elements given in the located predetermined data format minus the original value in the temporary variable,
- vi. whereas the specified distribution indication consists of the specification of the ending point and the specification of the number of intermediate network elements from the specified ending point, set the temporary variable to a value equals the original value in the temporary variable minus 1,
- vii. declaring the remote intermediate network element to be the network element specified in a signature stored in the located predetermined data format where the signature has an index in the array of signatures in the located predetermined data format equals to the value stored in the temporary variable should such an index exist, and
- viii. declaring no suitable remote intermediate network element should the index equal to the value stored in the temporary variable does not exist in the array of signatures in the located predetermined data format.

21. A communications network comprising at network control framework apparatus as recited in any of claims 1 to 16 for controlling resources at an intermediate network element connecting two or more communications networks.

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